[ ANARTS - Australian National Amateur Radio Teletype Society ]

ANARTS RTTY NEWS BULLETIN 809  15 May 1994

Sunday Transmission Schedules.

| | | |
|---|---|---|
| 3.545 MHz (Plus/minus 3) | 0930 UTC | VK2BQS (Jim) |
| 7.045 MHz (minus 3) | 0030 UTC | VK2CTD (Col) |
| 14.070 MHz (amtor/fec) | 0030 UTC | VK2DPM (Alan) |
| 14.091 MHz | 0030 UTC | VK2BQS (JIM) |
| 146.675 MHz | 0030/0930 UTC | VK2JPA (PAT) |
| 144.850 MHz (ax25 bbs) | | VK2JPA AT VK2RWI |
| 146.675 MHz (rtty mmbbs/repeater) | | VK2RTY |

Views expressed in this news bulletin are not necessarily those of the Broadcast Officer, the Relay Officers, or of the Society.

G-TOR - An Improvement?

G-TOR is a new digital mode, which has been developed by Kantronics. Most of its features (like on-line Huffman data compression, link-quality based baud rate adjustment, CRC, fundamentals of the packet structure, etc.) are adopted from PACTOR. The baud rate used in G-TOR can be 100, 200 or 300 baud. The main differences are the use of Golay forward error correction coding with the obligatory data interleaving and a hybrid ARQ system.

The Golay encoding however, as used in the G-TOR mode, is only able to correct 3 bits in a block of 24 bits and only half of this block (12 bits) carries information. The remaining 12 bits have to contain the required redundancy, and no new data. It is therefore only possible to correct a few errors despite the large overhead. For this reason the Golay encoding would only be useful for errors caused by short spikes on the higher short wave frequencies (10 to 20m).

You cannot however expect it to provide any improvements in typical 80m conditions. Here it is necessary not only to use hybrid-2 ARQ systems, but also suitable, powerful (invertible) codes, which allow the reconstruction of the original information, even when only the redundany block is received, rather than Golay or similar simple blockcoding, which always requires both blocks to be received to get the data trans-ferred.

The most robust HF (short wave), narrow band, data transmission systems known, apply very powerful convolutional codes with Viterbi decoding and soft decision (requiring an ADC/DSP just like analog Memory-ARQ). The processing speed of those systems exceeds the capability of a KAM by factor 100. Despite this very expensive approach, they only achieve around 10 dB better weak signal performance than PACTOR-1. The closer a system approaches the Shannon boundary (theoretical through-put limit) the more difficult it gets to gain another one or two decibels.

W0XI et al claim that they were able to transfer a certain file on the 20m band in about 5 minutes using G-TOR, whereas PACTOR, which was used afterwards, took about 20 minutes. The conclusion was that G-TOR would be about 4 times faster than

PACTOR in general, which is actually impossible!! According to the system description, G-TOR can on average only be about 1.5 times faster than PACTOR.

The 20m band, which was used for the tests, normally provides a good SNR and only very few fluctuations. It is therefore obviously no problem to reach higher throughputs, especially when using 300 baud (even short wave Packet Radio could have been faster than PACTOR in this case). Also, the comparison between PACTOR and G-TOR was based on the PACTOR implementation in the KAM, which does not, apparently, provide the full performance anyway, due to the different converter and the missing ADC. Since the KAM already uses a modem designed for 300 baud operation, it is obvious that G-TOR is favoured.

The original PACTOR system will still do better than G-TOR on weak signals, as an ADC is used in the PACTOR-Controller (PTC) to allow real analog Memory-ARQ. To achieve impartial results, you have to transfer the same files containing random characters on the typical 80m conditions in G-TOR using two KAMs and in PACTOR using two PTCs.

The 8.64 characters per second, considered to be the typical average throughput of PACTOR, and which led to the conclusion that G-TOR would be 4 times faster than PACTOR, are much slower than the average rate we obtained with our units. Under even worse conditions we obtained around 17 characters per second, depending on the transferred information due to the Huffman coding.

Regardless of the Huffman data compression, which improves the throughput of both systems in the same way, the comparison of throughput between PACTOR and G-TOR can be easily calculated. According to the protocol description published by W0XI, G-TOR is able to transfer a maximum of 19 characters per second when running on 200 baud (They claim 69 data bytes in a cycle duration of 2.4 seconds at 300 baud, which means maximum 2/3*69/2.4 characters per second at 200 baud). The maximum rate of PACTOR at the same speed is 16 chrs/s, which is a relationship of 1.18 to 1. The Golay encoding is not able to improve the throughput so dramatically that you finally result in a factor 4. It must be remembered that the analog Memory-ARQ, as used in the original PACTOR implementation, is able to improve the effective signal-noise ratio with each aggregated packet and hence enables a higher throughput (especially in weak conditions) than the Golay coding gain. It is therefore obvious that the higher maximum throughput of G-TOR is mainly based on its higher maximum baudrate. This however means, it has to exceed the usual 500 Hz band width limit.

With this in mind it must also be remembered that a wider receiver bandwidth receives more noise. A 300 baud G-TOR signal will therefore have a poorer S/N ratio than a 200 baud PACTOR signal (if they are both of the same fieldstrength and the receiver bandwidth is correctly adjusted for both modes). As signals decrease, G-TOR would have to switch to 200 baud before the PACTOR signal would be affected, thus further reducing some of the proposed speed gain.

There are still some more disadvantages of G-TOR in comparison to PACTOR, e.g. the cycle duration is quite long at 2.4 seconds, and will increase to almost 5 seconds when using the Golay encoding, hence leading to quite long break-in times.

The speed adaptation times are necessarily also longer, thus leading to poorer results in rapidly changing conditions (multipath).

Furthermore, the interleaving and the 3 different baud rates used in G-TOR will probably lead to a lot of problems with the listen mode, an important point for all digital modes used in Amateur Radio.

Actually G-TOR is just a modified PACTOR system, which probably does not provide enough improvement that introducing this mode as another new standard would be worthwhile. With regard to the basic requirements of each digital data transfer mode (like throughput, bandwidth, error rate, etc.) PACTOR already represents nearly the optimum attributes that are obtainable with an FSK system. A real improvement over the current PACTOR system can only be reached when using different modulation schemes like PSK, which require a DSP hardware.This step will be done this year with the introduction of PACTOR Level-II.

Tom Rink, DL2FAK

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VOLTA RTTY WW Contest (conclusion)

Contest period: from 1200z Saturday to 1200Z Sunday 14-15 May
(24 hours, no rest periods required)

Final score = total QSO points x total mults (band mults plus each INTERNATIONAL COUNTRY worked on 4 bands) x total number of QSOs. Use exchange points table to determine points scored for each QSO.

Awards: A SPECIAL trophy will be awarded to the top stations in each class. In addition, a certificate with special sticker to all entrants.

Logs: Use separate logsheets for each band. Logs must show: BAND, DATE and TIME (UTC), CALLSIGN and MESSAGE Sent and Received, POINTS and NEW MULTIPLIER PREFIX. Summary sheet must show full scoring, and list of multipliers worked.

Logsheets, summary sheets amd multipliers and dupesheets and the EXCHANGE POINTS TABLE are all available for copying from the RTTY Contesters Guide, published by RTTY Journal.

Logs must be received by July 30, 1993, to qualify.

Mail logs to:
Francesco Di Michele, I2DMI
P.O. Box 55
22063 Cantu
Italy

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IPS weekly report

6 May - 12 May 1994

Issue No 19
Date of issue: 13 May 1994
INDICES:

| Date | 06 | 07 | 08 | 09 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|

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10cm    074   074   074   077   080   082   087
A        29    30    33    24    24    25  (11 estimated)
T        13    17    10   -10    11    22    15

              I.P.S.  SUMMARY OF ACTIVITY

Solar activity was very low during the period.

The  geomagnetic field at Learmonth (WA) was mostly  unsettled
to active. There were minor storm periods on 7th-8th, and 11th
May

Ionospheric  F2 critical frequencies at Sydney were  about  10
per  cent  below  predicted levels on  6th,  and  mostly  near
predicted   values  for  the  rest of  the  week.  There  were
depressed periods to 30 per cent on 8th, and to 40 per cent on
11th.  Spread F was reported on 6th-9th,  and 11th-12th,  with
Sporadic E observed on 11th May.

           FORECAST FOR THE NEXT WEEK (13 - 19 May)

SOLAR:        Very low to low

GEOMAGNETIC:  Mostly  quiet to unsettled today.  Unsettled  to
              active with minor storm levels  14th-15th.

IONOSPHERIC  Near predicted monthly values to 30 per cent down
             14th-15th.   Otherwise  near  predicted   monthly
             values. Spread F may degarde night communications

Courtesy of IPS Radio and Space Services
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VK2SG RTTY DX NOTES 6 MAY 94

VK2SG RTTY DX NOTES FOR WEEKENDING 6 MAY 1994  (BID RTDX0506)

OUR THANKS THIS WEEK GO TO ZS5S, I5FLN, I5ICY, IK5AAX, J28JJ,
WB2CJL,  DJ3IW  AND THE CENTRAL EUROPE DX CLUSTER DB0SPC, AND
THE NJ0M NODE OF THE TWIN CITIES DX PACKETCLUSTER NETWORK.

BANDPASS:
FRIDAY 29
0550-14083 C91AI
0910-14087 T92X
1703-14084 VS6GA QSL KG6GA
2155-14087 5T5MS

SATURDAY 30
0723-14084 WL7EF
1026-14088 T28RW QSL ZL1AMO
1102-14088 YT7OX
1214-14087 S51DX
1214-14087 KG4CC
1544-14085 XU7VK
1726-14084 BV7WB
1845-14086 VY2SS
1944-14083 UA6JBQ
2237-14085 9A3TB

SUNDAY 1
0703-14085 5B4VX
0711-14087 NH6XM
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0741-14081 YT7OX
0744-14086 NL7VJ
1029-21086 Z21HD
1415-21085 VS6GA
1425-21070 J28JJ ARQ
1428-14088 HL1XP
1443-21084 ZD7DP
1556-21085 A41KD
1609-21080 TZ6FIC
1656-21083 VP8CIL
1728-14092 VY2SS
1730-14088 YT7CC
1922-21085 ZP5YW
1923-21086 FG5FI

MONDAY 2
0550-14082 C91AI

TUESDAY 3
NO REPORTS

WEDNESDAY 4
NO REPORTS

THURSDAY 5
NO REPORTS

NOTES OF INTEREST:

NORTHERN MARIANAS - JA6VZB AND JF6BCC WILL BE QRV FROM 26-30 MAY FROM KH0,
FOR THE CQ WPX CONTEST. OUTSIDE OF THE CONTEST THEY WILL BE QRV ON RTTY.
QSL KH2GR/KH0 TO JF6BCC AND AH0T TO JA6BSM.

CRETE -JULIUS, HA6NY, WILL BE ACTIVE AS SV9/HA6NY FROM 24-31 MAY ON RTTY

80 TO 10 METERS.

MARKET REEF - A GROUP CONSISTING OF OJ0/AC6T, OJ0/OH1VR, OJ0/OH6RM,
OH0MB, AND OJ0/OH2BBF WILL BE ACTIVE 14-17 MAY ON SSB, RTTY AND CW.
QSL TO HOME CALLS, EXCEPT OH0MB  WHICH SHOULD BE QSL'D TO OH0RJ.

BARBADOS -8P9GQ WILL BE ACTIVE ON CW, SSB AND RTTY 10-30 MAY, 80 TO 10 METERS.

ITU GENEVA - NOW UNTIL 11 MAY 4U9ITU ON CW, SSB AND RTTY. ALSO FROM
20-22 MAY A GROUP OF ITALIAN OPERATORS WILL BE ACTIVE USING THE SAME CALLSIGN

SEND YOUR BANDPASS AND NOTES OF INTEREST FOR NEXT WEEK'S BULLETIN TO
LUCIANO I5FLN AT ZS5S.ZAF.AF OR AT I5FLN.ITA.EU.

73 AND GOOD HUNTING DE JULES W2JGR AT W2TKU.#SRQFL.FL.NA

(VIA HF CLOVER)
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Coming events
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1994

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| May | 14th-15th | Volta RTTY WW Contest |
| June | 11th-12th | ANARTS WW RTTY DX Contest |

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Society information

The Society may be contacted at : PO Box 860, Crows Nest 2065 Australia, for such matters as membership and general enquiries. Enquiries can also be made by packet to the President (Col) VK2CTD, or the Secretary (Pat) VK2JPA @ VK2RWI or the current substitute BBS.

News items may be sent to Broadcast Officer PO Box 60 Blacktown 2148 Australia, or by packet to VK2JPA @ VK2RWI or as mentioned above.
Email address for the Broadcast Officer is :

patl@pitt.conmusic.su.oz.au

The Society welcomes new items on any digital subjects from anywhere in the broadcast footprint. We know we reach ZL and many South Pacific islands. We are looking forward to news from your areas to let other amateurs know what you are doing in the hobby. Hope to hear from you.

73s de Pat VK2JPA Broadcast Officer.
That concludes the ANARTS NEWS809 15/05/94.

Inserted by VK2BQS (Jim) Vice-President ANARTS
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